UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

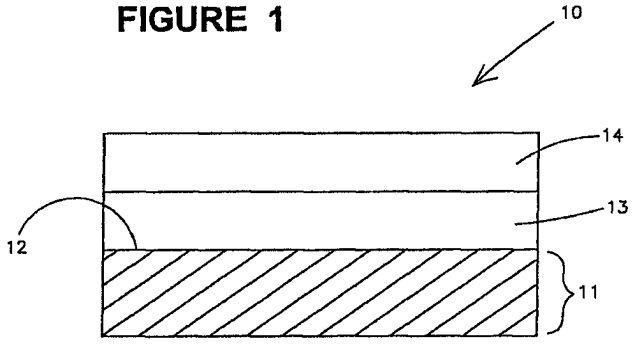
PATENT NO. : 7,560,815 B1
APPLICATION NO. : 09/603132
DATED : July 14, 2009
INVENTOR(S) : Vaartstra et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page should be deleted and substitute therefor the attached title page.

Please replace Figure 1 with the following Figure 1:

FIGURE 1



Signed and Sealed this

Thirteenth Day of July, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

Please replace Figures 3 and 4 with the following Figures 3 and 4:

FIGURE 3

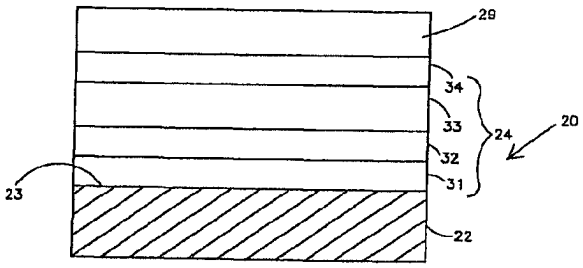
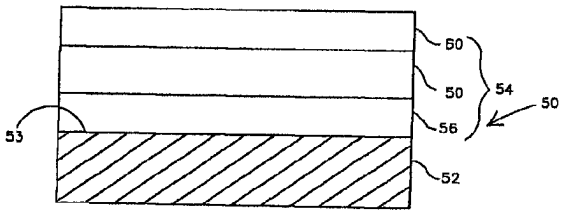


FIGURE 4



Please replace Figures 5 and 6 with the following Figures 5 and 6:

FIGURE 5

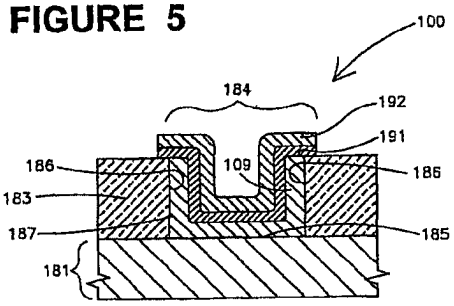
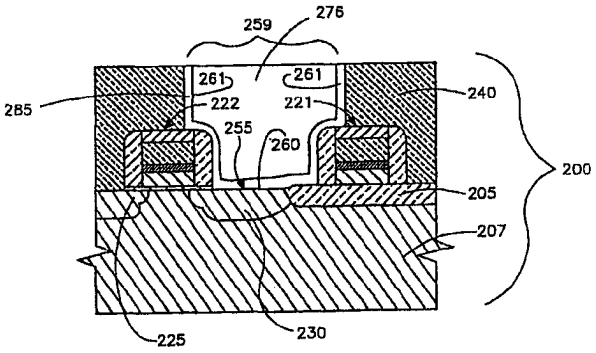


FIGURE 6



(12) **United States Patent**
Vaartstra et al.

(10) **Patent No.: US 7,560,815 B1**
(45) **Date of Patent: Jul. 14, 2009**

(54) **DEVICE STRUCTURES INCLUDING RUTHENIUM SILICIDE DIFFUSION BARRIER LAYERS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 734 days.

(21) Appl. No.: **09/603,132**

(22) Filed: **Jun. 23, 2000**

Related U.S. Application Data

(62) Division of application No. 09/141,240, filed on Aug. 27, 1998, now Pat. No. 6,197,628.

(51) **Int. Cl.**
H01L 29/94 (2006.01)

(52) **U.S. Cl.** **257/751**; 257/E23.16

(58) **Field of Classification Search** 257/486, 257/751, E23.16; 438/627, 643, 653
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,907,052	A *	3/1990	Takada et al.	357/30
5,005,102	A *	4/1991	Larson	361/313
5,017,551	A *	5/1991	Agostinelli et al.	505/235
5,122,923	A *	6/1992	Matsubara et al.	361/321
5,149,596	A	9/1992	Smith et al.	
5,168,332	A *	12/1992	Kunishima et al.	257/385
5,262,920	A *	11/1993	Sakuma et al.	361/321.5
5,270,241	A	12/1993	Dennison et al.	
5,362,632	A	11/1994	Mathews	
5,372,849	A	12/1994	McCormick et al.	
5,392,189	A	2/1995	Fazan et al.	
5,491,365	A *	2/1996	Chin et al.	257/751
5,510,651	A	4/1996	Maniar et al.	
5,520,992	A	5/1996	Douglas et al.	
5,555,486	A	9/1996	Kingon et al.	
5,561,307	A	10/1996	Mihara et al.	
5,566,045	A	10/1996	Summerfelt et al.	
5,581,436	A	12/1996	Summerfelt et al.	
5,612,574	A	3/1997	Summerfelt et al.	
5,618,746	A	4/1997	Hwang	
5,637,527	A	6/1997	Baek	
5,679,980	A	10/1997	Summerfelt	

(Continued)

FOREIGN PATENT DOCUMENTS

EP	0 856 879	8/1998

(Continued)

OTHER PUBLICATIONS

H. D. Bhatt et al., "Novel high temperature multilayer electrode-barrier structure for high density ferroelectric memories," *Appl. Phys. Letter*, 719-721 (1997).

(Continued)

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(57) **ABSTRACT**

A device structure including a substrate assembly having a surface. A diffusion barrier layer is formed over at least a portion of the surface. The diffusion barrier layer is formed of $RuSi_x$, where x is in the range of about 0.01 to about 10. Capacitor electrodes, interconnects or other structures may be formed with such a diffusion barrier layer.

20 Claims, 5 Drawing Sheets